

Indonesia Sea Toll Strategy Framework Directive: Innovative and Participatory Decision-Making Methods Towards the World Maritime Axis

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Abstract. The Government of Indonesia, through the Ministry of Transportation, has established a sea highway program as one of the main programs in the national midterm development plan for 2015 to 2019 [1]. Based on the literature we collected from the Ministry of Transportation of the Republic of Indonesia, the sea toll program in its implementation has a paradigm shift from the national logistics system so far. The Indonesian government carried out this sea highway program with the main objective of implementing a more effective and efficient delivery function from western Indonesia to the east to reduce economic inequalities and prices. The role of the government as a policymaker is very important in managing sea transportation and logistics systems.

Based on the literature and facts, the first sea tolls or they call it marine highway system was first managed by the United States government about 10 years ago based on America's Marine Highway Report to Congress [3], submitted by U.S. Department of Transportation, Maritime Administration. However, in the implementation of the sea toll system, especially in Indonesia there are still many problems, one of which is the government regulation that has been used so far has not fully followed the concept of the sea highway.

Besides that, in every province in Indonesia has its own Regional Government Regulation, which has special autonomy rights due to the enactment of the Law on Regional Autonomy. So that infrastructure development, especially seaports in each province, is often hampered and inaccurate because there are so many interests and rules that must be met. Our research we will focus on the issue of the implementation of the sea toll system, outlining with a qualitative approach related to alternative methods of decision making between port stakeholders throughout Indonesia that are innovative and participatory

Introduction

The Government of Indonesia, through the Ministry of Transportation, has established a sea highway program as one of the main programs in the national midterm development plan for 2015 to 2019 [1]. Based on the literature we collected from the Ministry of Transportation of the Republic of Indonesia, the sea toll program in its implementation has a paradigm shift from the national logistics system so far, as shown in Table 1.

The Indonesian government carried out this sea highway program with the main objective of implementing a more effective and efficient delivery function from western Indonesia to the east to reduce economic inequalities and prices. The role of the government as a policy maker is very important in managing sea transportation and logistics systems.

This is evidenced by data from the Indonesian Ministry of Transportation [1]. The number of national sea transport companies has increased by 7.7% per year from 2005 to 2013, and the national fleet supply has increased by around 10% per year. In 2013, the share of sea freight cargo in this country with national ships reached 99.7%. Based on this data, the role of the marine transportation system in Indonesia is very important.

On the other hand, if we look at it as a whole in the sea transportation system or port operations in particular, there are still some problems that occur in Indonesia. Based on data from the annual report of Pelindo [2], one of the state-owned enterprises as the main port authority, the problem that has occurred in Indonesia since 2012 is the high logistics costs (and ports), which is one of the highest in the world (24% of total GDP or Rp1,820 trillion per year)) compared to Malaysia (15% of GDP) or Japan and the US (10% of GDP). In addition, the average dwelling time at Indonesian ports is 5-6 days, far from Singapore, which is only one day including pre clearance, custom clearance, and post clearance time. The pattern of distribution and product prices in Indonesia is not evenly distributed between regions. The difference in port operating costs is also high between regions in Indonesia.

Table 1. Transformation in the Paradigm of Implementation of Sea Tolls [2]

Paradigm Transformation	
Before	After
Landway corridor	Air and maritime-based economic corridors
Logistics system for smooth flow of goods	Logistic system to support trading strategies
Economic corridors to strengthen existing economic centers and attract surrounding areas	Economic corridors encourage the creation of new growth centers and economic equality throughout the archipelago
Distribution of zones of western and eastern Indonesia	Division of zones based on foreland and inside (hinterland)
The unitary state of Indonesia is an archipelago (islands separated by waters)	The unitary state of the Republic of Indonesia is a piece of land (land that is interconnected by waters into one unit)
The Trade follow The ship	The Ship Promote The Trade & The Ship Follow The Trade

Based on the literature and facts, the first sea tolls or they call it marine highway system was first managed by the United States government about 10 years ago based on America’s Marine Highway Report to Congress [3], submitted by U.S. Department of Transportation, Maritime Administration. The waterborne movement of passengers and non-bulk freight between origins and destinations is accommodated by America’s marine highway system, otherwise served solely by roads and railways. Many of the nation’s most important land-based routes and connectors are parallel to the marine highway corridors. These corridors plays significant role in the nation’s broader domestic marine transportation system, which consists of 25,320 miles of navigable waterways, including rivers, bays, and channels, and many thousands of additional miles on the Great Lakes Saint Lawrence Seaway System and deep sea routes.

Whereas the application of the Sea Toll System in Indonesia is an effective process of increasing sea connectivity in the form of regular vessels scheduled from the west to the eastern part of Indonesia. There are several important elements that must be understood simply in the concept of the sea toll system, as shown in Table 2 below.

Table 2. Elements of the Sea Toll System [2]

		Elements				
Sea toll	Containers	Reliable port	Inland active access	Load adequacy between the east-west region and vice versa.	Shipping Industry	Regular and scheduled shipping
	Passengers & Cruise	Service specialization	Tourist and commercial destinations	Cruise; Traveling and Leisure	Integrated transport	

However, in the implementation of the sea toll system, especially in Indonesia there are still many problems, one of which is the government regulation that has been used so far has not fully followed the concept of the sea highway. Such regulation is like Government Regulation No. 61 of 2009 concerning Port, Government Regulation No. 5 of 2010 concerning Navigation, Government Regulation No. 20 of 2010 concerning Water Transportation and Government Regulation No. 21 of 2010 concerning Maritime Environmental Protection [4]. Some of these government regulations are not relevant to the development of the current maritime world and need adjustment. One example is the Government Regulation on Water Transport that does not accommodate information technology.

Besides that, in every province in Indonesia has its own Regional Government Regulation, which has special autonomy rights due to the enactment of the Law on Regional Autonomy. So that infrastructure development, especially seaports in each province, is often hampered and inaccurate because there are so many interests and rules that must be met.

Based on some previous literature studies, not much has been discussed specifically about this sea

highway system. Such as Loizidou et al. [5] in their study of the marine strategy framework directive, presents the results of a dedicated, participatory, structured decision-making process that is implemented within the framework of the Action Med project, which aims to bring experts and policy / decision-makers from the Mediterranean neighboring countries together, to discuss and agree on common measures for implementation in their Mediterranean sub-regions. Jihong Chen et al. [6] in their research, provides new ideas and information to the Chinese shipping industry's policymakers and stakeholders in order to handle the “flagging out” problem, thereby mitigating the current adverse situation of ship flagging overseas while strengthening the management of ship operation.

Still about marine strategy framework directive, Abramic et al. [7] in his research also discussed how to apply INSPIRE Directive 2007/2 / EC principles for efficient implementation of the Marine Strategy Framework Directive 2008/56 / EC (MSFD). For this reason, in our research we will focus on the issue of the implementation of the sea toll system, outlining with a qualitative approach related to alternative methods of decision making between port stakeholders throughout Indonesia that are innovative and participatory.

Literature Review

There are several literatures that have discussed the sea transportation system, which is generally through a qualitative approach either through survey or review methods, descriptive analysis, to the results of interviews with experts in Table 3.

Table 3. Comparative outcomes from previous studies for the variables used in this research.

Author/s	Findings	Scope for further research
1 Loizidou et al. [5]	A dedicated, participatory, structured decision-making process that is implemented within the framework of the Action Med project, which aims to bring together experts and policy makers / decision makers from neighboring Mediterranean countries to discuss and agree on common steps for implementation in their sub-region.	There needs to be a validation process related to the stakeholders involved and using other more technical method approaches.
2 Chen et al. [6]	New ideas and information to policy makers and stakeholders of the Chinese shipping industry to deal with the issue of "flagging out", thereby reducing the current bad situation involving ships sailing abroad while strengthening ship operations management.	Explore new international vessel registration systems that are compatible with the FTZ policy framework. Modification of systematic support policies must be carried out related to ship ownership, crew work, age restrictions, tax policy, ship survey services, and ship financing and insurance.

Table 3. Comparative outcomes from previous studies for the variables used in this research. (continuation)

Author/s	Findings	Scope for further research
3 Koliouis et al. [8]	The research conducted introduces a three-tier framework for the generation of maritime cluster typologies, that bears the potential to enrich strategic management and its eventual policy implications, towards a more streamlined and informed manifestation.	<p>Future research can take advantage of this framework to open up further aspects of regional competitiveness which lead to the powerlessness of the global economy in the face of economic difficulties.</p> <p>This framework is relatively simple and easy to implement, but will be more optimal if supported by analytical analytical methods, such as cross tabulation, statistical hypothesis testing, and relationship size; all are considered benchmarks of best practices in each domain.</p>
4 Satria et al. [9]	In this paper the transshipment indicators in the purse seine and long line vessels developed in the workshop are characterized, governance changes are discussed, and the adverse consequences and impact of the new policies that have recently been implemented have been highlighted.	<p>For island countries where fishing is an important component of the country's income, transportation is an important management problem that is full of challenges, both for shipowners and managers.</p> <p>Recent changes to legislation and increased enforcement of illegal activities highlight the potential for unintended consequences and changes in strategy because stakeholders respond to new policies and livelihoods may be threatened.</p>
5 Muawanah et al. [10]	This paper presents a review of current Indonesian laws and policies for an ecosystem approach to fisheries management (EAFM); an assessment to identify gaps, challenges and opportunities for an EAFM; and recommendations for EAFM implementation. A strong co-management structure of the fishery management area (FMA) governance is at the heart of EAFM implementation.	In the long run, the hope is that the Fisheries Management Commission at the FMA level will be able to independently change and or develop a newer version of FMP in accordance with regional fisheries conditions and needs. A strong shared management structure of FMA governance is at the heart of EAFM implementation.

Table 3. Comparative outcomes from previous studies for the variables used in this research. (continuation)

Author/s	Findings	Scope for further research
6 Abramic et al. [7]	This paper documents how to apply INSPIRE Directive 2007/2/EC principles for efficient implementation of the Marine Strategy Framework Directive 2008/56/EC (MSFD). It provides an overview of the different INSPIRE components, explains the relationship between the MSFD requirements and improves the understanding of distributed data management.	Synchronization of the surveillance system needs to be updated regularly, and there is a special platform for the system.

Sea Toll System

As we have shown in Table 2 about the elements of the sea toll system that have been implemented in the Indonesian archipelago, at this stage we will explain in more detail the related variables. So that later it can become the basis for recommendations on alternative methods of decision making between port stakeholders throughout Indonesia that are innovative and participatory.

Sea Toll System for Container Services

In the element of the sea toll system, especially container services, there are 5 supporting variables as shown in Figure 1. These variables are related to a reliable port, cargo adequacy transported both from the west to the east of Indonesia and vice versa, Shipping Industry, effective Inland Access and Scheduled routine shipping.

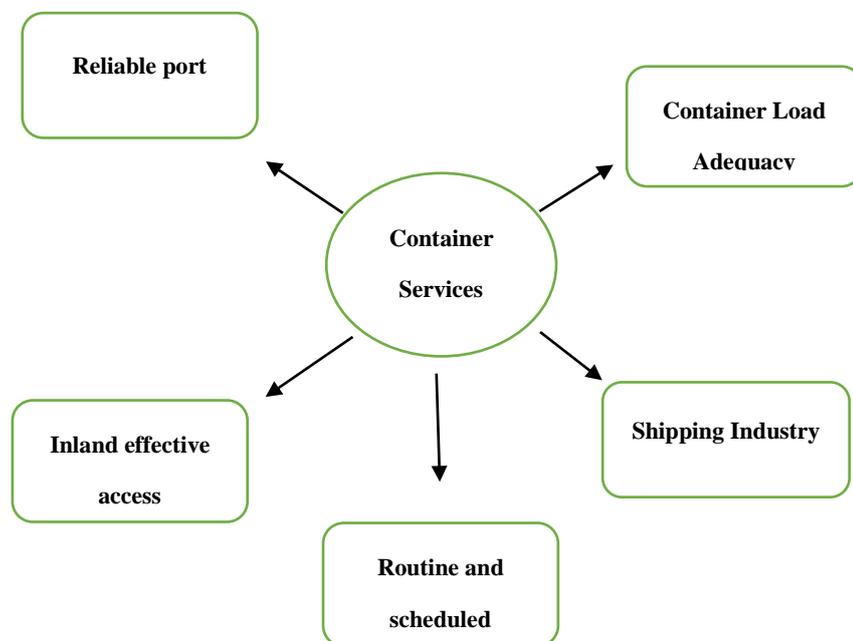


Figure 1. Chart of Sea Toll Elements Container Services [2]

Reliable ports are one of the important variables in the container service sea highway system, how port authorities and stakeholders involved in carrying out port service systems effectively and efficiently are the key to port performance. What is the percentage of the total capacity installed in the loading /

unloading process, the level of productivity, the effectiveness of the administrative / documentation process, the speed of access to data and information systems, water entrance transportation, and of course the effectiveness of other supporting stakeholders into important sub-variables in the level of service reliability port.

While routine and scheduled services, especially related to alternative service routes, the size (size) of the ship and its cargo, the effectiveness of the window system and I napor net (management information system).

The integration of supporting transportation modes for port access with land areas or islands makes service more effective and efficient. Both from the coast, river, land and pipeline access.



Figure 2. Shipping Industry supporting structure [2].

If we look in detail at the variable shipping industry, there will be many supporting sub-variables that are interrelated. So that in the decision-making process, there are many variables that need to be considered into several alternative decisions.

Sea Toll System for Passenger & Cruise Services

The sea toll system also does not only serve the container sector, but inter-island and cruise passenger transportation services are also included in the direction of the system policy. There are 4 variables included in the passenger & cruise service support system, namely service specialization, commercial / tourist destinations, travel / leisure shipping, and supporting transportation integrations as shown in Figure 3 below.

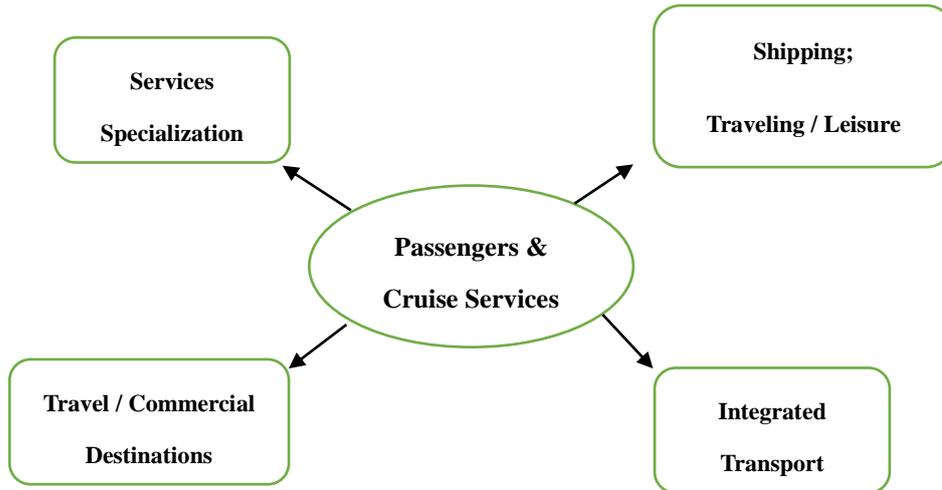


Figure 3. Chart of Sea Toll Elements for Passenger Services & Cruise [2]

Sea transportation services for passenger & cruise sectors, the last few years have significant challenges, both internally and externally. Competition with the air transportation market is the biggest challenge for the island nation, because the large number of low-cost flights between islands makes alternative air transportation more promising for consumers. However, in the concept of sea toll, passenger & cruise services need to slightly change the target market and its service model.

Starting with service specialization, service providers need to group services into several alternative services that consumers can enjoy. Service specialization will distinguish the quality of these services with other transportation services.

Focusing on these services can be seen in other variables, such as services which focuses on the tourism destination sector or commercial demand, then shipping that serves passengers who want to travel or leisure. And of course, the transportation service model that is integrated with other modes of transportation on land will greatly help and increase the satisfaction of passengers.

This is also reinforced based on our previous research, Kusuma et al. [11] about the analysis of the marine transportation and logistics system between Indonesia, Malaysia and the USA Country. The results of the descriptive analysis are shown in table 3 below.

Table 4 . Comparison of Marine Transportation and Logistics Industry Conditions [11]

	Indonesian	Malaysia	USA
Operation and Policy of Marine Transportat ion Industry	- There are approximately 70 major ports spread across 34 provinces. - Implement marine toll programs. - The main port is managed by the government as a state-owned enterprise.	- There are about 7 major ports of cargo. - Some ports are managed by private companies.	- There are about 100 major cargo ports. - Implement the American Marine Highway program.
ERP System Perceptiveness	- Implement marine information systems for internal port authority authorities. - Implementation of ERP is still not optimal, and only in some main ports only.	- Implement marine information systems for each stakeholder. - Implementation of new ERP is done in some ports only.	- Each port authority has its own information system.
ERP and IOT Platform	- Has not implemented integration between ERP and IOT. - Has not integrated the entire service process from each stakeholder in all major ports.	- Has applied the e-PAN application for the benefit of early arrival of vessel related to vessel security process which will be anchored. - Implementation of e-DCFZ application, which aims to facilitate processing of dangerous cargo documents and free zones.	- Has not implemented integration between ERP and IOT especially for integration of all service process.

Research Framework and Discussion

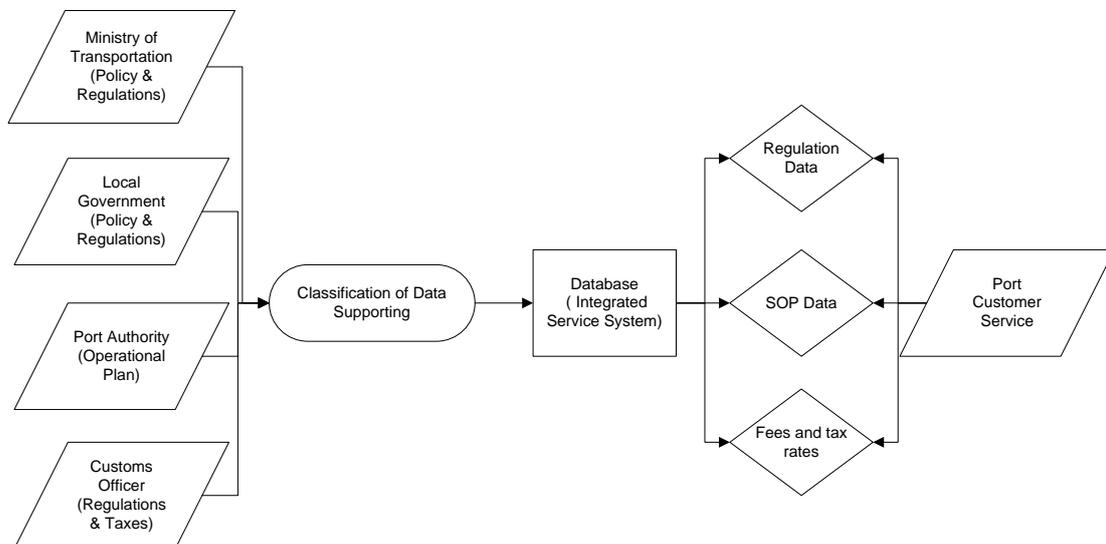


Figure 4. Chart of Research Framework

The implementation of the sea toll system, especially in Indonesia there are still many problems, one of which is the government regulation that has been used far has not fully followed the concept of the sea highway. Some of these government regulations are not relevant to the development of the current maritime world and need adjustment. In the other hand, every province in Indonesia has its own Regional Government Regulation, which has special autonomy rights due to the enactment of the Law on Region Autonomy. So that infrastructure development, especially seaports in each province, is often hampered and inaccurate because there are so many interests and rules that must be met.

Technological development in the world especially in the IT and mobile application system has good impact in business sector of shipping goods. Mobile application system (IT) helps shipping goods inter-island, moreover Indonesia has many islands spread. Shipping goods (seaports) by using mobile application system (IT) will reduce human error in business sector and easy to accessed by everyone because it's simple than using manual handling. This system also more accurate than using manual shipping goods and will have modern database about shipping goods report. From the point of view money and time, using Mobil Application System (IT) is better because this system effective and efficient.

First, starting with service specialization, service providers need to group services into several alternative services that consumers can enjoy. Service specialization will distinguish the quality of these services with other transportation services. Also focusing on these services can be seen in other variables, such as services which focuses on the tourism destination sector or commercial demand, then shipping that serves passengers who want to travel or leisure. And of course, the transportation service model that is integrated with other modes of transportation on land will greatly help and increase the satisfaction of passengers. This goes with stakeholders which are government as policy and regulation maker, port authorities as manage operational aspect in each port of each region, shipping company and travel agent that give certain services for customer port, and for consumers it is better commodities or individually for travelling.

Second, In the container services, there are 5 supporting variables of container services. These variables are related to a reliable port, cargo adequacy transported both from the west to the east of Indonesia and vice versa, Shipping Industry, effective Inland Access and Scheduled routine shipping. Reliable ports are one of the important variables in the container service sea highway system, how port authorities and stakeholders involved in carrying out port service systems effectively and efficiently are the key to port performance. Routine and scheduled services are especially related to alternative service routes, the size (size) of the ship and its cargo, the effectiveness of the window system and Inaport net (management information system). The integration of supporting transportation modes for port access with land areas or islands makes service more effective and efficient. Both from the coast, river, land and pipeline access. If we look in detail at the variable shipping industry, there will be many supporting sub-variables that are

interrelated. So that in the decision-making process, there are many variables that need to be considered into several alternative decisions.

Conclusion

The Government of Indonesia, through the Ministry of Transportation, has established a sea highway program as one of the main programs in the national midterm development plan for 2015 to 2019. The Indonesian government carried out this sea highway program with the main objective of implementing a more effective and efficient delivery function from western Indonesia to the east to reduce economic inequalities and prices. The methodological approach of Sea Toll System is the way to implement a sea highway program through Database (Integrated Service System) which Integrated with Port Customer Services. Whereas there are some steps to integrate database and port customer services which limit among 4 stakeholders (Ministry of Transportation, Local Government, Port Authority, Customer Officers):

1. Regulation Data. The authority of regulation and rules of sea transportation and logistics systems is government (Ministry of Transportation) where government has authority to make and to change the rules. So, external consumers only have access to find out some information of regulation data because they don't have authority to decide the regulation sea transportation and logistics system, but there is a problem that regulation and role in Indonesia is different between one are with another because local government in each region have their own authority and autonomy to change and to make rules and policy.
2. SOP Data, the authority of SOP Data is port authorities, where port authorities can make, design and establish the groove of SOP Data. So, external consumer can only access to see and know the groove of SOP Data.
3. Fees and Taxes, where fees and taxes is the most accessed by consumers because it's used to pay port services.

Those three steps have their own boundary and each stakeholder's authorities. Therefore, Database (Integrated Service System) Synchronization actually to integrate each stakeholders including Local Government to make effectively decision and logistic cost and dwelling time problem caused because each stakeholders has their own administration process that caused complicated process so as extortion occurrence.

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